

Remarks

This is in response to the Office Action mailed on November 14, 2003. Claim 2 has been canceled without prejudice, and subject matter from claim 2 has been incorporated into claim 1. Claim 1 has been amended, support for which can be found, for example, at page 3, lines 31-33, and page 5, lines 4-9 of the present application. Claims 1 and 3-9 remain pending. Reconsideration and allowance of all claims are respectfully requested.

Preliminarily, Applicants' representatives wish to thank the Examiner for the courtesy extended during the Interview of February 20, 2003. During the Interview, claim 1 and Huber et al., U.S. Patent No. 5,938,003, were discussed. The amendments and remarks contained herein are consistent with the discussions held during the Interview.

In section 1 of the Action, claims 1 and 5-9 were rejected under 35 U.S.C. § 102(a) as being anticipated by Huber. This rejection is respectfully traversed.

Claim 1 is directed to a roller drive unit for conveying an object. Claim 1 now recites a first controllable brake to slow down the drive roller to cause the lifting apparatus to lift the drive roller out of the retracted position into the raised position and to be completely opened during propelling of the object without slowing down the drive motor, as well as a second controllable brake to hold the lifting apparatus in the raised position. Claim 1 now also recites that the first and second controllable brakes are electrically controllable.

In contrast, Huber discloses a roller drive unit in which a brake mechanism 90 is provided in addition to brake 70 (which acts on the lifting mechanism) and brake 80 (which acts on the drive shaft of the motor). The brake mechanism 90 continuously brakes the drive roller 30 (and thereby the driver motor 20) for enabling a lifting mechanism 40 to lift up the drive roller 30. See column 3, lines 62-65 of Huber (describing the light braking of the drive roller). The force generated by the lifting apparatus, and thus the force pressing the driver roller 30 against an object for propelling the object, depends on the braking momentum generated by the uncontrollable brake 90.

The configuration disclosed in Huber can be disadvantageous for several reasons. For example, for lifting a large and heavy driver roller 30 from the resting position into the raised operating position, a relatively large braking momentum must be generated by brake 90. During

propelling of the object, this braking momentum is subtracted from the driving momentum of motor 20 as brake 90 is continuously braking drive roller 30.

In addition, when drive roller 30 is lifted into the raised position and comes into contact with the propelled object, frictional forces between the object and driver roller 30 slow down drive roller 30 and thus increase the force of the lifting apparatus. If the force of the lifting apparatus increases, the frictional force between driver roller 30 and the propelled object increases so that a large propelling force is acting on the propelled object. If, however, the propelled object has a slippery base (e.g., a container having a slippery bottom due to water, ice, or oil), driver roller 30 slips and a very low braking momentum acts on driver roller 30. In this situation, the lifting force generated by the lifting apparatus is low, which results in a low force pressing driver roller 30 to the propelled object. In other words, the more slippery the propelled object, the smaller the pressing force that is generated between the driver roller 30 and the propelled object.

Further, if the braking momentum of brake 90 is increased in Huber to solve the above-noted problems, not only does the power of the motor 20 have to be increased, but also wear due to the continuous frictional engagement with the brake 90 increases. Further, undesired heat generated by the brake 90 also increases.

Huber fails to disclose or suggest a first electrically controllable brake to slow down the drive roller to cause the lifting apparatus to lift the drive roller out of the retracted position into the raised position and to be completely opened during propelling of the object without slowing down the drive motor, as well as a second electrically controllable brake to hold the lifting apparatus in the raised position, as recited by claim 1. A roller drive unit configured as recited by claim 1 solves the above-noted problems associated with that disclosed by Huber.

For example, when the lifting apparatus of the present invention lifts the driver roller, the first electrically controllable brake slows down the driver roller, and the driving momentum of the motor is completely transferred to the lifting apparatus, thereby pressing the driver roller firmly to the propelled object. This avoids the "aquaplaning" phenomenon noted above associated with Huber. After contact between the driver roller and propelled object is made, the second electrical controllable brake is closed and the first electric controllable brake is opened. Because the drive roller is in non-slipping contact with the propelled object (due to the closed

second brake), the lifting force is not reduced by opening of the first brake. Thereby, the driver roller 30 remains pressed against the propelled object and no slipping occurs. This makes it possible, for example, to convey objects including bottoms having even layers of ice on them.

In addition, Huber fails to suggest using first and second electrically controllable brakes, as recited by claim 1. The electrically controllable brakes are advantageous so that both brakes can be open and closed as necessary to avoid slipping and thereby avoid wear.

For at least these reasons, Huber fails to anticipate claim 1, as well as claims 5-9 that depend therefrom. Reconsideration and allowance are respectfully requested.

In section 2 of the Action, claims 2 and 3 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Huber. This rejection is respectfully traversed.

Claim 2 has been canceled. Claim 3 depends from claim 1 and should therefore be allowable for at least the same reasons as expressed above with respect to claim 1. Reconsideration and allowance of claim 3 are respectfully requested.

In section 3 of the Action, the Examiner noted that claim 4 would be allowable if rewritten in independent form. Applicants appreciate the Examiner's identification of allowable subject matter. All claims should now be in condition for allowance.

In view of the above amendments and remarks, claims 1 and 3-9 are in condition for allowance. Reconsideration and allowance of all pending claims are respectfully requested. The Examiner is encouraged to contact the undersigned attorney at (612) 371-5265 with any questions concerning this application.

Respectfully submitted,
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